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NOTES ON GEOGRAPHIC DISTRIBUTION

Cyphelium inquinans (Sm.) Trev. (Lichenized: Ascomycota): A new record for India

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ABSTRACT: This study reports *Cyphelium inquinans* as a new distributional record of the calicioid lichens from India. The taxon is characterized by its verrucose gray thallus; larger ascomata with whitish pruina on the upper and outer edge of the exciple and 1-septate, dark brown ascospores with distinctive ornamentation. It is an interesting addition to the lichen flora of India and detailed taxonomic description with illustrations are provided herewith to facilitate the identification of species.

The lichen genus *Cyphelium* Ach. (Physciaceae, Teloschistales, Ascomycota – Lumbsch and Huhndorf 2010) is represented by 12 species worldwide (Weber 1967; Tibell 1984; Tibell 1996; Tibell and Ryan 2004), of which only one species is known from India (Singh and Sinha 2010). The genus is characterized by its crustaceous thallus with *Trebouxia* as photobiont; sessile or immersed, black, widely exposed mazaedioid, yellow or white pruinose or epruinose apothecia; well developed carbonized exciple; 8-spored asci becoming evanescent later on, and brown, 1-septate to rarely submuriform, broadly ellipsoid, ornamented ascospores with constriction in the middle. During the course of studies on the microlichens of North- East India, an interesting species of *Cyphelium* was collected from Arunachal Pradesh, Eastern Himalaya, India. After thorough consultation of literature, protologue and on critical studies, it has been confirmed as *Cyphelium inquinans* (Sm.) Trev. It is an interesting addition to the Indian lichen flora that is described below along with its illustrations for easy identification of the taxon.

The specimen pertaining to this species is deposited in the ASSAM herbarium. Morphological characters of thallus, reproductive structures, colour, size and shapes were examined under stereomicroscope (NIKON SMZ 1500). Thin hand-cut sections were mounted in water for studying the anatomy of thalli and fruiting bodies under a compound microscope (NIKON Eclipse 50i, Digi 2). Ascospores measurements were taken in water mounts using: '(min)a–b(max)', where 'a' is the mean minus 1 standard deviation (SD), 'b' is the mean plus 1 standard deviation, '–' indicates the range between 'a' and 'b', and 'min' and 'max' denote the minimum and maximum recorded values, respectively. Estimated values are followed by number of observations (n). Lichen substances were identified by thin-layer chromatography (TLC) using solvent A (180 Toluene: 60 dioxane: 8 acetic acid) following White and James (1985).

Cyphelium inquinans (Sm.) Trevison, *Flora*, Jena 45: 4. 1862. *Lichen inquinans* Sm., in Smith & Sowerby, Engl. Bot. 12: tab. 810. 1801, *Calicium inquinans* (Sm.) Schaer., Naturw. Anzeiger Allgem. Schweizer. Gesellsch. Naturwiss. 5: 35. 1821.

Thallus crustose, corticolous, epiphloeodal, suborbicular in outline, 3–6 cm across, 0.2–0.3 mm thick, granular to verrucose, usually thick, corticate and well developed; surface pale to dark gray; prothallus indistinct; cortex 15-20 µm thick; photobiont layer green, 38–50 µm thick with *Trebouxia* as an alga, cells 10–16 µm wide. Apothecia mazaedioid, sessile, 0.9–1.5 (-2.0) mm wide, 0.4-0.8 mm high; disc black, short cylindrical with whitish pruina on the upper and outer surface of the edge of the exciple; exciple blackish brown to strongly carbonized, 125–160 µm thick laterally and, 290–380 µm thick at the base; hypothecium pale brown, 100–150 µm high; asci 8-spored, becoming evanescent at later stage, cylindrical, with uniseriately arranged ascospores, 45-65 × 5-6 µm; ascospores brown to dark brown, 1-septate, ellipsoidal to broadly ellipsoid, thick walled, constricted in the middle, (12.7) 13.5–15.6 (16.8) µm long (SD= 1.1, n=100) and (7.7) 8.1–9.0 (9.6) µm wide (SD=0.7, n=100), with distinctive ornamentation of longitudinally arranged ridges and irregular cracks. Pycnidia not seen; although, the ejected ascospore masses fallen on the thallus surface give the appearance of pycnidia.

Chemistry: Thallus K+ yellow to reddish brown, C-, P-, UV-; TLC: atranorin.

Cyphelium inquinans is characterized by its verrucose gray thallus; larger ascomata [0.9–1.5 (-2.0) mm wide] with whitish pruina on the upper and outer edge of the exciple and 1-septate, dark brown ascospores with distinct ornamentation. Morphologically, it resembles *C. lucidium* (Th. Fr.) Th. Fr. but later species has yellow thallus and the distinct yellow pruina on the margin of the apothecia. In thallus colour, it closely resembles *Cyphelium chlorococonium* (Tuck.) Zahlbr., which has smaller apothecia with yellow streak on the margin and smaller ascospores (7–12 × 5–6 µm, vide Weber, 1967). *Cyphelium sessile* (Pers.) Trev., another species known from India (Singh and Sinha 2010) is parasitic or parasymbiont on *Pertusaria* species or other lichens.

Ecology: The species grows on the trunk of *Abies* sp. in open places between 3200 and 3650 m altitude in subalpine area which remains snow covered from November to middle of March every year.

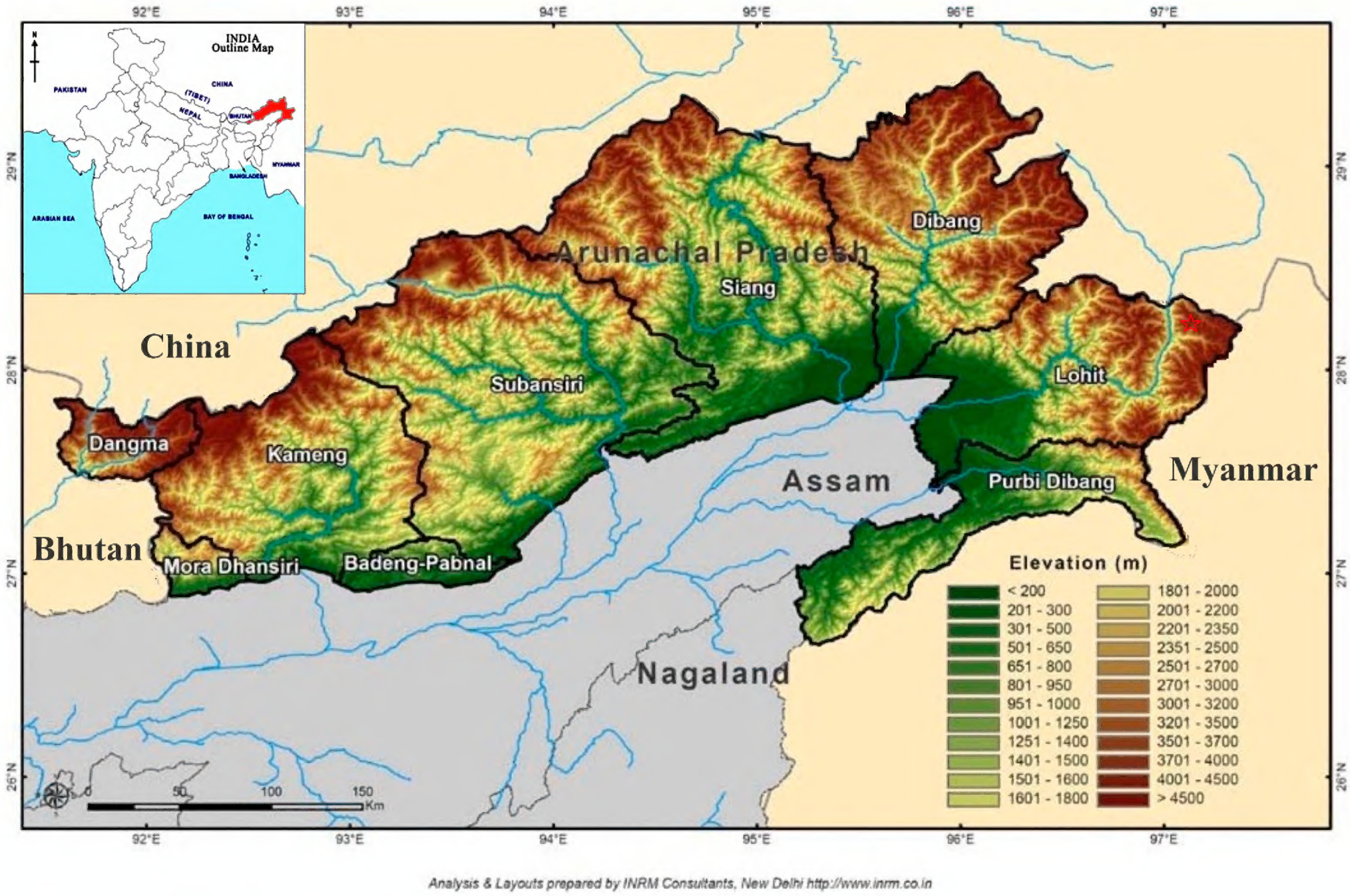

FIGURE 1. Study area: Lohit district, Arunachal Pradesh, Eastern Himalaya, India.

Distribution: Australasia, Europe, western North America, South America and now India.

Specimen examined: INDIA, Arunachal Pradesh, Lohit district; Hot spring, Jachup foot tract, on bark, 28°30′60″ N, 97°24′60″ E, alt. 3200–3650 m, K. P. Singh 7802 [ASSAM].

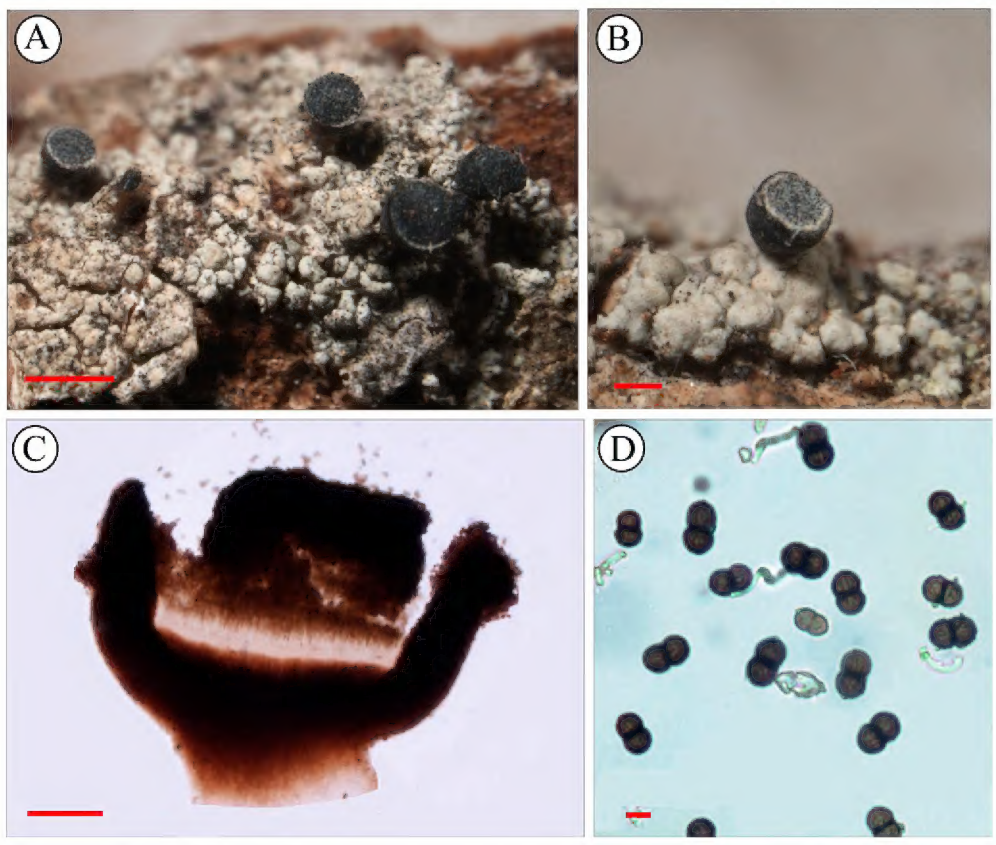

FIGURE 2. A–D. *Cyphelium inquinans*. A–B, Habit with mature ascomata; C, Vertical section of apothecia; D, mature ascospores; Scales: A = 2 mm; B = 1 mm; C= 200 µm; D = 10 µm.

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LITERATURE CITED

Lumbsch, T.H. and S.M. Huhndorf. 2010. Myconet Volume 14. Part One. Outline of Ascomycota—2009. Part Two. Notes on Ascomycete Systematics Nos. 4751–5113. *Fieldiana Life and Earth Sciences* 2010 (1): 1–64.

Singh, K.P. and G.P. Sinha. 2010. *Indian Lichens: An Annotated Checklist.* Kolkata: Botanical Survey of India. 165 pp.

Tibell, L. 1984. A reappraisal to the taxonomy of Caliciales. *Beiheft zur Nova Hedwigia* 79: 667–669.

Tibell, L. 1996. Caliciales. *Flora Neotropica Monograph* 69: 1–78.

Tibell, L. and B.D. Ryan. 2004. *Cyphelium*; pp. 57–61, in: T.H. Nash III, B.D. Ryan, P. Diederich, C. Gries and F. Bungartz (ed.). *Lichen flora of the greater Sonoran Desert region*. Volume. II. Tempe, Lichens Unlimited, Arizona State University.

Weber, W. A. 1967. A Synopsis of the North American Species of *Cyphelium*. *Bryologist* 70: 197–203.

White, F.J. and P.W. James. 1985. A new guide to the microchemical technique for the identification of lichen substances. *British Lichen Society Bulletin* 57 (supplement): 1–41.

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